

PATENT

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09/599709  
06/22/00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: R.M.Lange

Serial No.: 09/599709

Examiner: Meethley

Filed: Herewith 6-22-00

Art Unit: 1714

For: DISPERSANT-VISCOSITY IMPROVERS FOR LUBRICATING OIL COMPOSITIONS

Commissioner of Patents  
Washington, D.C. 20231

INFORMATION DISCLOSURE STATEMENT

Sir:

Pursuant to 37 CFR 1.97 and 1.98 and in compliance with 37 CFR 1.56, the Office's attention is directed to the patent publications listed on the attached Forms PTO-1449. A concise explanation of the document is provided herewith. Pursuant to 37 CFR 1.98(d) copies of the cited documents are not provided since they are available in parent application serial number 08/713,704. The Examiner is requested to consider each document, to make them of record in the application by initialing in the spaces provided on the Form PTO-1449, and to return a copy of the initialed forms PTO-1449 to Applicant's representative in due course.

The identification of any reference in this Information Disclosure Statement is not intended to be, and should not be understood as being, an admission that such reference, in fact, constitutes "prior art" within the meaning of applicable law. The "prior art" status of any reference is a matter to be resolved during prosecution.

The filing of this Information Disclosure Statement shall not be construed to be an admission that the information cited in this statement, is, or is considered to be, material to patentability as defined in 37 CFR 1.56(b).

The disclosure of this information is not a representation that any search has been made or that no other material information as defined in 37 CFR 1.56(b) exists.

CONCISE DESCRIPTION OF CITED DOCUMENTS

A copy of Applicant's information disclosure statement, including Form 1449, filed December 11, 1996 in parent application serial number 08/713,704 is enclosed herewith.

References cited by the examiner in the parent application are  
U.S. 5,512,192 (Lange et al, April 30, 1996)

This patent describes a composition of matter suitable for use as a dispersant viscosity improver for lubricating oil compositions comprising the reaction product of reactants comprising (a) an oil soluble substantially hydrogenated, vinyl substituted aromatic-aliphatic conjugated diene block copolymer, said copolymer having number average molecular weight ranging from about 30,000 to about 300,000, grafted with an ethylenically unsaturated carboxylic acid or functional derivative thereof; (b-1) at least one polyester containing at least one condensable hydroxyl group; and (b-2) at least one polyamine having at least one condensable primary or secondary amino group, and optionally, (c) at least one hydrocarbyl substituted carboxylic acid or anhydride.

U.S. 5,540,851 (Lange, July 30, 1996)

This patent describes dispersant viscosity improvers for lubricating oil compositions comprising the reaction product of reactants comprising (a) an oil soluble ethylene-alpha olefin copolymer wherein the alpha olefin is selected from the group consisting of C<sub>3-28</sub> alpha olefins, said copolymer having number average molecular weight ranging from about 30,000 to about 300,000, grafted with an ethylenically unsaturated carboxylic acid or functional derivative thereof; (b-1) at least one polyester containing at least one condensable hydroxyl group; and (b-2) at least one polyamine having at least one condensable primary or secondary amino group, and optionally, (c) at least one hydrocarbyl substituted carboxylic acid or anhydride.

The foregoing descriptions of the cited documents are based on a review thereof by the undersigned. It is not intended that the descriptions should be considered to be unfailingly accurate and complete. Copies of the cited documents are available to the examiner in the parent application to provide the Office with an opportunity to review same and to reach an independent conclusion as to the content and relevance thereof.


INFORMATION DISCLOSURE STATEMENT  
09/057,922

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Applicants believe that no fee is required for the filing of this document. However, if any fees are due, the Commissioner is hereby authorized to charge such fee to our deposit account No. 12-2275.

Respectfully submitted,

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PATENT

2765R



*COPY*

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on

*December 11, 1996*

Date of Deposit

*[Signature]*  
Joseph P. Fischer Reg. No. 31,758

*December 11, 1996*

Date of Signature

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Richard M. Lange

Serial No. 08/713,704

Examiner:

Filed: September 13, 1996

Art Unit: 1108

For: DISPERSANT-VISCOSITY IMPROVERS FOR LUBRICATING OIL COMPOSITIONS

Assistant Commissioner for Patents  
Washington, D.C. 20231

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INFORMATION DISCLOSURE STATEMENT

Sir:

Pursuant to 37 CFR 1.97 and 1.98 and in compliance with 37 CFR 1.56, the Office's attention is directed to the patents, publications and other information listed on the attached PTO-1449. A concise explanation of each document is provided herewith. A copy of each listed document is enclosed. The Examiner is requested to consider these documents, to make them of record in the present application by initialing in the spaces provided on the Forms PTO-1449, and to return copies of the initialed forms PTO-1449 to Applicants' representative in due course.

The Information Disclosure Statement is being filed within three months of filing of the national application (37 CFR 1.97(b)(1)).

The identification of any reference in this Information Disclosure Statement is not intended to be, and should not be understood as being, an admission that such reference, in fact, constitutes "prior art" within the meaning of applicable law. The "prior art" status of any reference is a matter to be resolved during prosecution.

The filing of this Information Disclosure Statement shall not be construed to be an admission that the information cited in this statement, is, or is considered to be, material to patentability as defined in 37 CFR 1.56(b).

The disclosure of this information is not a representation that any search has been made or that no other material information as defined in 37 CFR 1.56(b) exists.

Any modifications to the original form of any documents submitted in connection with this Information Disclosure Statement, whether by underlining, interlineation, marginalia, or otherwise, should be disregarded, as the times, persons and reasons involved in such modifications may have no relation to or bearing on the present application.

#### CONCISE DESCRIPTION OF CITED DOCUMENTS

##### U.S. 4,077,893 (Kiovsky, March 7, 1978)

Described are lubricating oil additives having both dispersant and viscosity index-improving properties prepared by reacting a selectively hydrogenated star-shaped polymer having at least 4 arms of polymers or copolymers of dienes and monoalkenyl arenes with an alpha-beta unsaturated carboxylic acid or derivative and then reacting the resulting intermediate with an alkane polyol.

##### U.S. 4,169,063 (Kiovsky, September 25, 1979)

This patents describes lubricating oil additives having both dispersant and viscosity index-improving properties prepared by reacting an ethylene-propylene copolymer with chlorine and/or an alpha-beta unsaturated dicarboxylic acid or derivative, then reacting the modified polymer with a C<sub>1</sub> to C<sub>18</sub> amine containing 1 to 8 nitrogen atoms.

U.S. 4,517,104 (Bloch, et al, May 14, 1985)

Described are oil soluble viscosity index-improving ethylene copolymers, such as copolymers of ethylene and propylene; and ethylene, propylene and di-olefin; reacted or grafted with ethylenically unsaturated carboxylic acid moieties then reacted with polyamines having two or more primary amine groups and a carboxylic acid component or the grafted ethylene copolymer can be reacted with already formed salts, amides, imides, etc. of said polyamine and acid component.

U.S. 4,632,769 (Gutierrez, et al, December 30, 1986)

This patent relates to oil soluble viscosity improving ethylene copolymers reacted or grafted with ethylenically unsaturated carboxylic acid moieties then reacted with polyamines having two or more primary amine groups and a C<sub>22</sub> to C<sub>28</sub> olefin carboxylic acid component or the salt or amide formed by pre-reacting the C<sub>22</sub> to C<sub>28</sub> acid component with said polyamine. The products are said to be useful in lubricating oil and fuel compositions.

U.S. 4,670,173 (Hayashi, et al, June 2, 1987)

This patent describes compositions suitable for use as dispersant-viscosity improvers for lubricating oils made by reacting an acylating reaction product which is formed by reacting a hydrogenated block copolymer and an alpha-beta olefinically unsaturated reagent in the presence of free-radical initiators, with a primary amine and optionally with a polyamine and a mono-functional acid.

U.S. 4,735,736 (Chung, April 5, 1988)

The patent relates to polymeric viscosity index (V.I.) improvers-dispersant additives for synthetic and petroleum oils, particularly lubricating oils, methods for their preparation, and oil compositions containing them. These additives comprise a hydrocarbon polymer, for example a copolymer of ethylene with one or more C<sub>3</sub> to C<sub>28</sub> alpha-olefins, preferably propylene, or a hydrogenated copolymer of styrene and butadiene or isoprene, etc., which has been grafted with an acid moiety, e.g. maleic anhydride, followed by reaction with a

polyamine, preferably a tertiary polyamine having only a single acetylatable amine group, followed by reaction with ammonia or monoamine.

U.S. 4,803,003 (Chung, February 7, 1989)

Described are ethylene-alpha olefin copolymers grafted with an ethylenically unsaturated dicarboxylic acid material and thereafter reacted with a polyamine having at least two primary amine groups, and a carboxylic acid to form carboxyl-grafted polymeric imide derivatives which are subsequently reacted with a C<sub>12</sub> to C<sub>18</sub> hydrocarbyl substituted dicarboxylic acid anhydride. Oil solutions thereof are said to be characterized by minimal viscosity change over an extended period of time.

U.S. 5,035,821 (Chung, et al, July 30, 1991)

Described in this patent are oil soluble viscosity index improvers-dispersants comprised of the reaction products of (i) ethylene copolymer, such as copolymer of ethylene and propylene, grafted with ethylenically unsaturated carboxylic acid moieties; (ii) polyamine having two or more primary amino groups or polyol; (iii) an amount effective to provide a VI improver-dispersant exhibiting improved cold temperature viscometric properties of a high functionality long chain hydrocarbyl substituted dicarboxylic acid material such as alkenyl succinic anhydride having a functionality of at least 1.2; and (iv) a molecular weight stabilizing effective amount of a short chain hydrocarbyl substituted dicarboxylic acid or anhydride.

U.S. 5,049,294 (Van Zon, et al, September 17, 1991)

This patent relates to dispersant/VI improver oil additives produced by reacting an alpha-beta unsaturated carboxylic acid or derivative with a selectively hydrogenated star-shaped polymer, then reacting the product so formed with a long chain alkane-substituted carboxylic acid and with a C<sub>1</sub> to C<sub>18</sub> amine containing 1 to 8 nitrogen atoms and/or with an alkane polyol having at least two hydroxy groups or with the pre-formed product thereof.

U.S. 5,160,648 (Steckel, November 3, 1992)

High molecular weight N-containing condensates are reacted with, inter alia, oil soluble carboxylic acids to form dispersant materials.

U.S. 5,210,146 (Gutierrez, et al, May 11, 1993)

The patent describes a composition of matter said to be useful as a multi-functional viscosity index improver for lubricating oils comprising the reaction product of a copolymer of ethylene and at least one other alpha-olefin monomer, said copolymer comprising intramolecularly heterogeneous copolymer chains containing at least one crystallizable segment of methylene units and at least one low crystallinity ethylene-alpha olefin copolymer segment, wherein at least one crystallizable segment comprises at least about 10 weight percent of said copolymer chain and contains at least about 57 weight percent of said copolymer chain and contains at least about 57 weight percent ethylene, wherein said low crystallinity segment contains not greater than about 53 weight percent ethylene, and wherein said copolymer has a molecular weight distribution characterized by at least one of a ratio of  $M_w/M_n$  of less than 2 and ratio of  $M_z/M_w$  of less than 1.8 and wherein at least two portions of an individual intra-molecularly heterogeneous chain, each portion comprising at least 5 weight percent of said chain, differ in composition from one another by at least 7 weight percent ethylene, said copolymer grafted with ethylenically monounsaturated carboxylic acid material having 1-2 carboxylic acid groups or anhydride group to form grafted ethylene copolymer and at least one polyamine containing one primary amino group and from 1 to about 6 secondary amino groups.

EP 0,352,070 B1 (Exxon, January 24, 1990)

This patent is directed to multi-functional viscosity index improvers comprising the reaction product of ethylene copolymers grafted with ethylenically unsaturated carboxylic acid moieties; polyamines or polyols; and a high functionality long chain hydrocarbyl substituted dicarboxylic acid material containing a polyolefin of from about 400 to about 10,000 number average molecular weight and having a functionality of from 1.2 to about 2.

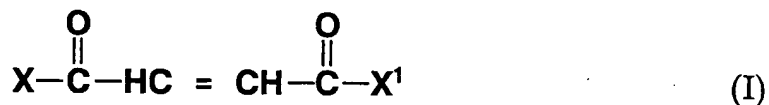


Oleaginous compositions containing these multi-functional viscosity improvers, which are said to also function as dispersants, exhibit improved low temperature viscometric properties.

EP 0682102 AZ (BP Chemicals, November 15, 1995)

A process is disclosed which comprises reacting at elevated temperature

(a) a copolymer of an olefin and a monomer having the structure



wherein X and X<sup>1</sup> are the same or different provided that at least one of X and X<sup>1</sup> is such that the copolymer can function as a carboxylic acylating agent and

(b) a succinimide prepared from an acyclic hydrocarbyl substituted succinic acylating agent and a polyamine wherein the hydrocarbyl substituted acylating agent is prepared by reacting a polyolefin and an acylating agent of formula I under conditions such that at least 75 mole % of the starting polyolefin is converted to the hydrocarbyl substituted succinic acylating agent. Hydrocarbyl substituted succinic acylating agents derived from high reactivity PIB's are preferred.

WO 96/01854 (Exxon, January 25, 1996)

The publication relates to succinimide dispersant additives prepared from functionalized hydrocarbons or polymers reacted (e.g. derivatized) with "heavy polyamines", including mixtures of higher oligomers of polyalkylene, e.g. polyethylene, amines containing, e.g., essentially no tetraethylene pentamine, small amounts of pentaethylenehexamine but primarily oligomers with 7 or more nitrogens, 2 or more primary amines per molecule and more branching than conventional polyamine mixtures. Use of heavy polyamines are said to allow for incorporation of greater amounts of nitrogen into the dispersant molecule than prior art amines and thusly, superior sludge dispersancy properties. The succinimide dispersants are taught as useful as additives in fuel and lubricating oils.

Ranney, M.W., "Lubricant Additives", Noyes Data Corp. (1973), pp. 119-136

This publication described United States patents relating to viscosity index improvers and dispersants issued from 1970 - 1972.

Ranney, M.W., "Lubricant Additives, Recent Developments", Noyes Data Corp. (1978), pp. 151-159)

This publication discusses United States patents directed to viscosity index improvers and dispersants issued from 1976-1977.

Ranney, M.W., "Synthetic Oils and Additives for Lubricants, Advances Since 1977", Noyes Data Corp. (1980), pp. 119-150

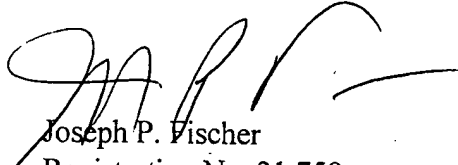
This publication discusses disclosures of United States patents directed to dispersant-viscosity improvers from 1978-1979.

The foregoing descriptions of the cited documents are based on a review thereof by the undersigned. It is not intended that the descriptions should be considered to be unfaillingly accurate and complete. Copies of cited documents are enclosed herewith to provide the Office with an opportunity to review same and reach an independent conclusion as to the content and relevance thereof.

Applicants believe that no fee is required for the filing of this document. However, if any fees are due, the Commissioner is hereby authorized to charge such fee to our Deposit Account No. 12-2275.

Respectfully submitted,

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